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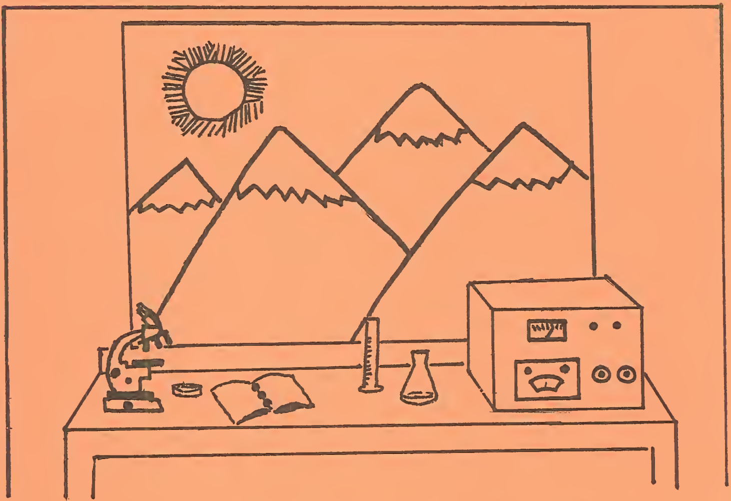

ANNUAL REPORT FOR FISCAL YEAR 1974

MONTANA

Laboratory Division

State Department of Health and Environmental Sciences

David B. Lackman, Ph.D., Administrator

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THIS ISSUE OF THE ANNUAL REPORT IS DEDICATED TO TWO FAITHFUL COLLEAGUES WHO HAVE DEVOTED A LARGE PORTION OF THEIR PROFESSIONAL CAREERS TO OUR LABORATORY

Ludwig Champa, Chief Chemist and Chief of the Chemistry Laboratory Bureau, who retired on May 31, 1974. Lud came to the Department in March, 1934, and has served Montanans as a chemist for over 40 years.

Patricia Maxey, Bacteriologist, retires on December 31, 1974. Pat came to the Department in 1947, and has run the venereal disease serology section almost singlehandedly since then.

* *

INTRODUCTION

Once again it is time to render an accounting to our financial backers, the taxpayers. We produced 206,999 tests and much consultation and training in '74. This represented an expenditure of public funds of $342,995 ($257,995 from our own budget and about $85,000 donated to us from the budgets of program Divisions). For Montana this figures out as $0.476 per capita for Public Health Laboratory services. In the consolidated annual report* for 1973, Montana was number 21 with a per capita expenditure of $0.453, New Jersey was number 20 with $0.468, and North Dakota was number 22 with $0.409. Alaska was highest among the states with $2.505, while Missouri was number 50 with $0.103.

The functions of the State Public Health Laboratory are broad and are becoming more so with each passing year. Increases in the laboratory budget do not match our greatly expanded activities, most especially in the area of laboratory services for environmental health. In 1973 we were credited with 139,164 tests in the consolidated report while in 1974 we did 206,999 tests. This represents an increase of 49 percent in expectations from the laboratory. The functions of the laboratory can be summarized as follows:

I. To serve as a reference laboratory for difficult and unusual procedures; and to do tests of a screening nature which would be too costly to perform if done in small numbers in individual laboratories.

II. To make provisions for tests required by statute or code, and to approve laboratories authorized to do these tests.

III. To provide laboratory services for other Divisions, Bureaus, and Sections in support of their programs and special studies; and to provide services to other Departments by special agreement or contract.

IV. To provide consultation on results of tests and other considerations in the realm of medical sciences.

V. To strive for improvement in clinical and public health laboratories in Montana.

VI. To shorten the latent period between results of research in medical and sanitary science and their application for the benefit of the consumer.

Matters concerned with the certification of laboratories and personnel has been pretty well taken over by the Bureau of Health Insurance of the Social Security Administration. Therefore, we are not planning to introduce further legislation dealing with this subject. Our legislative effort for this session will be a bill for a Forensic Laboratory in Montana. The Board of Health and Environmental Sciences has offered the facilities of the Department for this laboratory.

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*Consolidated Annual Report on State and Territorial Public Health Laboratories, Fiscal Year 1973, Center for Disease Control, Atlanta, Georgia

CHEMISTRY LABORATORY BUREAU

Walter A. Jankowski, Bureau Chief

The chemistry laboratory was responsible for 62,799 tests and accounted for $71,042 (28 percent) of the money spent directly from the budget of the Division ($259,579). Expenditures in the highway alcohol program were $33,751 and environmental health and industrial hygiene accounted for $37,291.

1. Water Chemistry, John Hawthorne, Section Head

This was a period of greatly increased activity in water chemistry. In what follows we will endeavor to give you, the reader, some idea of the magnitude of this effort. All of the increases in activity which are outlined in what follows were financed from sources other than the budget of the Division.

Increased personnel: The Water Quality Bureau added a supervisory chemist to oversee water chemistry activities in the laboratory and coordinate field sampling with laboratory analysis. One chemist was transferred from the toxicology section to Water Chemistry, and another moved from half-time to full-time as a water chemist. A laboratory and field technician was hired to log samples in and distribute completed reports, perform simple analysis, and maintain and dispense equipment and bottles needed by field personnel of the Water Quality Bureau. A part-time laboratory helper was also added and assigned to glassware cleanup.

Increased instrumentation: During fiscal 1974 the Water Chemistry section acquired the following instruments :

Dohrmann DC-50 Organic Carbon Analyzer
Two Aminco micro-Kjeldahl digestion and distillation set-ups (for organic nitrogen determinations)
Beckman RC-18A research-quality conductance bridge
Varian arsine-hydrogen selenide-mercury vapor generator (when used in conjunction with the Varian 1200 Atomic Absorption unit, arsenic, selenium, and mercury can be detected at the parts-per-billion level)
A used dual-channel Technicon autoanalyzer (purchased from St. John's Hospital in Helena; currently, used to speed up the analyses of nitrate, nitrite, ortho-phosphate and total phosphorus)
Phipps 6-unit multiple water analysis stirrer (used for flocculation studies)
Coulter counter (for bioalgalassay work)
CRC dishwasher
Tyler refrigerator 6' x 4'

Increased space: Laboratory space devoted to water chemistry was doubled and equipped with about 40 linear feet of lab benches obtained from St. John's Hospital. Two chemical-resistant sinks were installed in the benches. Also from St. John's, an 8' x 8' x 1' set of shelves was acquired for storing water samples. Additional usable laboratory space was created when a basement room was obtained for use as a Field Trip Staging Area. Previously, field equipment and sampling bottles had been stored in the laboratory. A second basement room was equipped for bioalgalassay work (the determination of eutrophic status of lakes and which nutrients are eutrophication-limiting).

Increased analytical capability: The table following the Water Chemistry Report, lists the various water quality parameters for which our laboratory has analytical capability. Of the 58 parameters listed, methods for 19 were developed in 1974 (FY 1974, new methods were developed to replace or supplement those being used for 6 other parameters, and modifications or method development was undertaken for another 3 parameters ; methods for 28 of the 58 parameters listed were changed, researched, or initiated during the year.)

In addition, a bioalgalassay capability was established to aid the Water Quality Bureau as they begin a survey of the eutrophic status of Montana's lakes and reservoirs.

Increased Quality Control: Recognizing that the accuracy and precision (reproducibility) of the numbers generated by chemical analyses depend not only on the chemist and his methods but also on the ability of the field sampler to obtain a representative, uncontaminated sample, work was begun on a quality control program for water sampling and analysis. A preliminary Field Procedures Manual was prepared and a Laboratory Procedures Manual was started. Quality control programs were initiated for several of the parameters, using the EPA "Analytical Quality Control Handbook" as a guide.

Active Programs : The water chemistry section analyzed samples from 36 active sampling programs of the Water Quality Bureau. These programs can be grouped as follows:

Ongoing programs

Private Water Supplies
Municipal Water Supply Survey
Municipal Sewage Lagoon Effluent Monitoring
Municipal Sewage Plant Effluent Monitoring
Industrial Discharge Monitoring
Permanent Water Quality Monitoring Stations

Studies of the Sixteen major drainage basins in Montana

(The boundaries of each basin were determined by the Department of Natural Resources. Each study will generate a Water Quality Management Plan for that basin)

Upper Missouri
Missouri-Sun-Smith
Middle Missouri
Lower Missouri
Musselshell
Milk
Marias
Upper Yellowstone
Middle Yellowstone
Lower Yellowstone
Little Missouri
St. Mary
Flathead
Kootenai
Upper Clark Fork
Lower Clark Fork

Short-term projects

Frohner Mine-Lump Gulch Area Study
Hoerner-Waldorf Well Study
Water Characterization-Beaverhead National Forest
Dry Fork of Belt Creek-Water Pollution Study
Flathead Lake Nutrient Study
Small Lakes Nutrient Study (Kalispell area)
Gallatin Basin Waste Allocation Study
SCS Water Quality Survey
Stream Survey-Helena National Forest
Colstrip Area Water Quality Study
Upper Clark Fork Water Quality Monitoring
Blackfoot Drainage Water Quality Study
Saline Seep Study*
Old West Commission Study
(Effects of Energy Development on the Yellowstone Basin)

* (see following page)

NOTES: Samples analyzed in our laboratory must be part of a program approved by the Water Quality Bureau. Exceptions are: private drinking water samples (does not include water used solely for irrigation or livestock), analyses requested by doctors and dentists for diagnostic purposed, and occasional samples submitted by County Sanitarians.

* As of this writing, a review of the suitability of current analytical procedures as they apply to saline waters is underway. Already it has become necessary to modify the method for nitrates. It was found that calcium ion was interfering with analysis for nitrate so now it is removed by pre-treating the sample with a cation exchange resin. Some agriculturalists maintain that the destruction of farm lands by saline seeps poses as great a threat to the "way-of-life" in eastern Montana as does the strip mining of coal.

Increased output: A tremendous increase in sample load was experienced in fiscal 1974 = total samples increased from 1340 to 3441, and analyses from 11,632 to 29,125. These figures do not include analyses performed in the field or in the two Water Quality Bureau laboratories in Billings and Kalispell.

Breakdown by sample type

Private Water Supplies	355
Municipal Water Supplies	284
Acid mine drainage	228
Municipal discharges	110
Industrial discharges	83
General Water Quality	2381
Total samples	3441

Breakdown of analyses

pH	1457	Sulfate	1403
Specific conductance	1562	Nitrate	1935
Turbidity	882	Ammonia	151
Residue (suspended solids)	445	Ortho phosphate	1498
		Total phosphorus	794
Calcium	1397	Total Kjeldahl nitrogen	257
Magnesium	1383	Iron	1764
Sodium	1395	Copper	1502
Chloride	1377	Zinc	1476
Alkalinity ($CO_3^=$ and HCO_3^-)	1378	Lead	717
		Cadmium	1099
Arsenic	976	Hardness	1439
Manganese	633	Acidity	103
Mercury	272	Dissolved Oxygen	86
Chromium	45	Tannins & lignins	4
Tin	2	Taste & Odor	9
Aluminum	49	Residual Chlorine	5
Silver	36	Surfactants (MBAS)	1
Selenium	4	Boron	6
Potassium	3	Lithium	1
Nickel	5	BOD	224
COD	43	TOC	192
Color	70	Phenols	57
Oil & Grease	28	Fluoride	950

In addition, 11 bioalgalassays were performed on samples from Flathead Lake (2), Clark Fork River (3), St. Mary's Lake (2), Swan Lake, Echo Lake, Hauser Reservoir, and the East Gallatin River.

Evaluation and needs: There has been a good start toward our goal of being the best Water Quality laboratory in the Northwest. Parameter capabilities and equipment have been substantially increased, the personnel are very capable and gaining good experience rapidly, and coordination with the Water Quality Bureau is at a high level. Much remains to be done, however; more control is necessary over the volume of samples arriving at the laboratory (we have had an excessive backload of samples since April). Much work on rigid quality control programs in the field and the laboratory remains to be done. The laboratory at present has very limited capability for organic analysis, and most samples sent to EPA for analysis of organics have not been analyzed within a reasonable time. With the conclusion of the major basin studies, major sample types will begin to shift away from streams toward lakes, discharges, and saline seeps - waters which require analysis for different parameters or which possess different interferences to our methods. What this change will mean to the laboratory is not fully known at present, but most likely we will need some new equipment. Our present cost-per-analysis figures are very approximate and need updating. Time-per-analysis can be substantially reduced in many instances by automating part or all of the analysis and by reducing the time spent in calculations and graphing. Funds are needed to purchase the necessary automated equipment and programmable calculator.

Inspection and certification of laboratories performing chemcial analysis on potable waters in Montana is needed. This should parallel the system currently used for laboratories doing bacteriological testing of water for use on interstate carriers.

ANALYTICAL CAPABILITY IN WATER CHEMISTRY (July 1974 Revision)

PARAMETER	METHOD	REFERENCE[1]	FREQ.[2]	NOTES
1. Acidity	Titration with 0.02 N NaOH after H_2O_2 oxidation and boiling	ASTM, p.148	E	Added in FY '74
2. Alkalinity	Titration with 0.02 N H_2SO_4	SM, p.52	R	
3. Aluminum	(A) Ferron, Ortho-phenanthroline	USGS, P.44	RI	
	(B) Atomic Absorption	SM, p.210	RI	Added in FY '74
4. Antimony	Atomic Absorption	SM, p.210	RI	Added in FY '74
5. Arsenic	Silver Diethyldithiocarbamate	SM, p.62	R	
	Arsine Generation, Atomic Absorption	Varian	R	Added in FY '74
6. Beryllium	Atomic Absorption	SM, p.210	RI	Added in FY '74
7. Biochemical Oxygen Demand	Modified Winkler	SM, p.489	R	
8. Boron	Carmine	SM, p.72	E	Will switch to Curcumin Process
9. Cadmium	Atomic Absorption	SM, p.210	R	
10. Calcium	(A) EDTA Titration	SM, p.84	R	
	(B) Atomic Absorption	SM, p.210	R	
11. Chemical Oxygen Demand	Dichromate Reduction	SM, p.489	E	
12. Chloride	Mercuric Nitrate Titration	SM, p.97	R	
13. Chlorine	Ortho-Tolidine	SM, p.117	E	
	DPD	SM, p.129	E	Added in FY '74
14. Chromium	Atomic Absorption	SM, p.210	RI	Added in FY '74
15. Cobalt	Atomic Absorption	SM, p.210	RI	Added in FY '74
16. Color	Visual Nessler Method with Aqua-Tester	SM, p.160	R	
17. Copper	Atomic Absorption	SM, p.210	R	
18. Cyanide	Distillation & $AgNO_3$ Titration or colorimetry (Pyridine-Pyrazolone)	EPA, p.41	E	Added in FY '74

19. Dissolved Oxygen	Modified Winkler	EPA, p.53	R	
20. Fluoride	(A) Automated Complexone Method	EPA, p.66	R	
	(B) Specific Ion Electrode	Orion	R	
21. Hardness	(A) Titration with EDTA	SM, p.179	R	
	(B) By Calculation from Ca, Mg Analyses	SM, p.179	R	
22. Iron	(A) Ferron-Orthophenanthroline	USGS, p.44	R	
	(B) Atomic Absorption	SM, p.210	R	
23. Lead	Atomic Absorption	SM, p.210	R	
24. Lithium	Atomic Absorption	SM, p.210	RI	Added in FY '74
25. Magnesium	(A) EDTA Method, by difference	SM, p.179	R	
	(B) Atomic Absorption	SM, p.210	R	
26. Manganese	Atomic Absorption	SM, p.210	R	Added in FY '74
27. Mercaptans	GC with EC Detector	Anal.Chem.	E	In Process
28. Mercury	Varian mercury generation, Atomic Absorption	Varian	RI	Method changed in FY '74
29. Molybdenum	Atomic Absorption	SM, p.210	RI	Added in FY '74
30. Nickel	Atomic Absorption	SM, p.210	RI	Added in FY '74
31. Nitrogen-Ammonia	Specific Ion Electrode	Orion	R	Both Methods)
	Distillation, Nesslerization	EPA, p. 134	R	Added in FY '74)
32. Nitrogen-Kjeldahl	Digestion & Distillation, Nesslerization	EPA, p.149	R	Evaluating Ammonia Electrode Method
33. Nitrogen-Nitrate	(A) Phenoldisulfonic Acid	SM, p.234	R	
	(B) Automated Hydrazine Reduction, Diazotization	EPA, p.185	R	Added in FY '74
34. Nitrogen-Nitrite	Diazotization	SM, p.240	E	Automated in FY '74
35. Nitrogen-Organic	By difference (Kjeldahl N-Ammonia N)			
36. Oil & Grease	Pet. Ether Extraction, Evaporation, Gravimetric	SM, p.254	E	Will evaluate TOC method
37. pH	pH Meter	SM, p.276	R	
38. Phenols	4 Amino-Antipyrene	SM, p.501	E	
39. Phosphate-Ortho	(A) Stannous Chloride, Ammonium Molybdate	SM, p.530	R	
	(B) Automated Molybdate-Antimonyl tartrate method	EPA, p.246	R	
40. Phosphorus-	(A) Digestion, Stannous Chloride-Molybdate	SM, p.530	R	
	(B) Digestion, Automated Molybdate-Antimony Method	EPA, p.246	R	
41. Potassium	Atomic Absorption	SM, p.210	RI	Added in FY '74
42. a.Residue-Fixed	Ignition at 550°C, Gravimetric	SM, p.292	RI	
b.Residue-Total Nonfilterable, or Filterable	Filtration, Evaporation at 105°C, Gravimetric	SM, pp.290-1	R	
43. Selenium	Atomic Absorption	SM, p.210	E	
	H_2Se Generation, Atomic Absorption	Varian	E	Added in FY '74
44. Settleable Solids	Imhoff Cone	SM, p.539	E	
45. Silver	Atomic Absorption	SM, p.210	RI	Added in FY '74
46. Sodium	Atomic Absorption	SM, p.210	R	
47. Specific Conductance	Wheatstone Bridge	SM, p.323	R	
48. Strontium	Atomic Absorption	SM, p.210	RI	Added in FY '74
49. Sulfate	(A) Thorin Titration	USGA, p.152	R	
	(B) Gravimetric	SM, p.333	R	

50. Surfactants (MBAS)	Methylene Blue	SM, p.339	E	
51. Suspended Solids	See Residue, Nonfilterable			
52. Tannin-Lignin	Phosphomolybdic Method	SM, p.346	E	Added in FY '74
53. Tin	Atomic Absorption	SM, p.210	RI	Added in FY '74
54. Total Organic Carbon	TOC Analyzer	Dohrmann	R	Added in FY '74
55. Turbidity	Nephelometric	SM, p.350	R	
56. Vanadium	Atomic Absorption	SM, p.210	RI	Added in FY '74
57. Zinc	Atomic Absorption	SM, p.210	R	
58. Silicon	(A) Atomic Absorption	SM, p.210	E	Both methods
	(B) Molybdate Blue	USGS, p.139	E	Added in FY '74

ANALYTICAL CAPABILITY IN WATER MICROBIOLOGY

59. Coliform, Total	(A) MPN	SM, p.664	R
	(B) Membrane Filter	SM, p.679	R
60. Coliform, Fecal	(A) MPN	SM, p.669	R
	(B) Membrane Filter	SM, p.684	R
61. Strep.Fecal	(A) MPN	SM, p.689	R
	(B) Membrane Filter-Count and Speciate	SM, p.690	R
62. Plate Count	Pour Plate Technique	SM, p.660	R
63. Salmonella	Concentrate with MF, Trans. to Enrichment Media	SM, p.698	R

In Water Chemistry 29,125 tests were performed on 3,441 samples.

NOTES

1. REFERENCES. SM - "Standard Methods for the Examination of Water and Wastewater", APHA, AWWA, WPCF, 13th Edition, 1971

EPA - "Methods for Chemical Analysis of Water and Wastes", U.S. Environmental Protection Agency, 1971

ASTM - "ASTM Standards, Part 23 : Water, Atmospheric Analysis", 1972

USGS - "Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases", Techniques of Water-Resources Investigations of the United States Geological Survey, Book 5, Chapter A1, 1970

Anal. Chem. - Analytical Chemistry Journal article

ORION, DOHRMANN, VARIAN - Procedures as recommended by equipment manufacturers

2. FREQ. - R: Analyses which are run on a routine basis. Equipment is permanently set up, standard solutions are kept available

RI: Analyses which are run infrequently, but could become routine. Equipment is permanently set up, but usually standards are unstable and must be prepared when analysis is run.

E: "Exotic" analyses - run very infrequently. Equipment must be set up and standards prepared for each analysis. Laboratory must be notified at least one day before samples arrive.

EE: There are "exotic exotic" analyses which could be performed if necessary, but have not been done in recent recorded history.

2. Air Chemistry, William Hooper, Section Head in FY '74, transferred to Industrial Hygiene in '75

Bench space for air chemistry was doubled and a room was constructed to house a new Mettler H54 microbalance. This allowed the use of particle-sizing high volume air samplers (Anderson hi-vols) in the field. Two additional instruments were purchased - a Leco induction furnace, which gives total sulfur values, and a Parr adiabatic calorimeter, which determines BTU content of fuels. Results from these instruments, when combined to give sulfur-to-BTU ratios, will be used to enforce air quality regulations for fossil fuel-burning industries.

In addition to capability for determing total sulfur and BTU content, and performing hi-vol particle sizing, the air chemistry section developed a method for determing fluorides from a fluoride tape sampler. Methods were also devised for analysis of metals in soil, using atomic absorption spectroscopy. The metals methods were used extensively in the analysis of samples submitted under the Air Quality Bureau's Colstrip study. The Air Quality chemists' involvement in other Air Quality Bureau projects involved field work (sampling, testing and maintenance of field instruments). The projects included: hydrocarbon monitoring at the Phillips Refinery in Great Falls, stack testing in Columbia Falls, evaluation of the accuracy of the data generated by the self-monitoring instruments at Hoerner Waldorf Corp. in Frenchtown, installing and calibrating the equipment in a trailer laboratory used in Butte to sample hydrocarbons and particulates, and routine maintenance and calibration of a field trailer used in an East Helena smelter study.

Quality control was also a concern of the air chemists. Within the laboratory, fluoride standards were obtained from the Boyce Thompson Planning Institute, New York, and placed in routine use. The laboratory participated in the EPA Quality Assurance Study for SO_2, using the modified West-Gaeke method. Field quality control procedures were written for the hi-vols, Andersons, and bubblers.

Activity at sampling stations is conducted mainly by field samplers from the Air Quality Bureau, although, as mentioned above, laboratory personnel frequently are involved. A summary of field activity during fiscal 1974 follows.

Areas and Locations	Number of Active Sampling Stations	Average Number of Samples Collected Per month	Average Number of Determinations Per month	Comments Note: H.V.'s=High Volume Air Sampler D.F.'s=Dust Fall
Anaconda Area	13	22	22	Willow Glen Sta.terminated 6/74
Butte	5	67	77	5 H.V.'s 1-Anderson Impactor, 1-membrane, 1-tape sampler (180 samples), 1-SO_2pH, 1-F-plate Harrison School Sta. opened 2/74 terminated 6/74
Billings	55	115	115	30 F-Plates/mo, 35 SO_2 plts p/m from Jan.74-on, 55 SO_2 plts p/mo. thru Dec., 35 veg. samples p/mo. thru Apr. 74, 130 total bubbler samples
Colstrip Area	16	161	161	116 Samples p/mo. as of Nov. 1973

Decker Area	4	20	20	Terminated Decker sampling (excluding H.V.) 2/74 (H.V.shut down temp. 5/23/74 - 10/8/74)
Dillon Area	6	14	14	Terminated Dillon Study 10/25/73
Eastern Region	29	104	104	July 1973 - June '74 Prior to July '73, 60 sampling sta. were in use with 208 samples per mo. being collected, including Sidney area
Missoula Area	28	48	48	4 Sta.'s in Arlee, MT. terminated 7/26/73 4-D/F samples + 4 H.V. samples. Other samples for Forest Service (2 ea/site - 48 lead plates)
Philipsburg	8	12	17	7 Dust Falls 1-High Vol. sampler
Ramsay Area	8	13	13	No H.V. this area
Sidney Area	9	30	30	Terminated all stations this area 12/11/73
Western Region	56	120	120	Thompson Falls - H.S. terminated 10/6/73; includes 8. H.V.'s, 48 F-plates; 25 Mt. boxes, 1 Pb. Plate; Total of 353 H.V. Samples
Helena & E. Helena area	12	22	22	1 H.V. sampling at 3/da. intervals
Great Falls Area	8	55	55	3 H.V. Stations 6 SO_2 plate Sta.
TOTALS	257	803	818	

Samples analyzed in the laboratory numbered 4,365 and were received in various forms; **filters** and bubblers containing airborne pollutants, vegetation, soils, and seventeen samples of bees and pollen. Analyses performed on these samples are summarized below:

Sulfur dioxide	959	NO	84
Fluorides	2153	Dustfalls	1066
Cadmium	207	Arsenic	73
Carbon monoxide	8	Lead	234
Zinc	185	Calcium	82
Copper	138	Iron	148
Magnesium	82	Sodium	83
Potassium	82	Lithium	77
Chromium	97	Manganese	111
Mercury	78	Tin	110
Antimony	105	Vanadium	111
Silver	110	Beryllium	108
Selenium	79	Strontium	110

6,680 Total tests

With the instrumentation added this past fiscal year, capability in the air chemistry section is judged sufficient for all possible types of analysis which may be requested, with two exceptions: gas chromatography utilizing flame photometric detection is needed to differentiate between sulfur-containing pollutants, such as mercaptans, carbon disulfide and SO_2. Our present chromatograph lacks the flame photometric detector. Sulfation analysis is presently a manual operation which is time-consuming; automated equipment would be very desirable to increase efficiency, precision, and accuracy.

3. Environmental Services Chemistry (Consumer Protection), Thomas Daly, Section Head

Total activity in this area was disappointing, especially after promising in the fiscal 1973 report that this is one unit in which we plan greatly increased activity in fiscal 1974. A second chemist was added to the staff in February to assist Lud Champa with the load increase, and reorganization of the laboratory provided 50% more space for Environmental Services and Occupational Health chemistry, but the total samples recived and analyses performed in fiscal 1974 dropped to half the amount run in 1973:

	total samples	total analyses
Fiscal 1973	135	625
Fiscal 1974	89	368

Our obvious need for fiscal 1975, therefore, is an increased sample load from Environmental Services or from outside the department for better utilization of equipment and personnel.

Detailed Summary of Analyses Performed in fiscal 1974

Hamburger	: 316 separate analyses for fat and moisture content and the presence of soya flour, lactose, and starch were performed on 64 samples.
Flour	: Three samples were analyzed for iron content; one for copper, iron and the organoleptic test.
Milk	: Five samples analyzed for lead.
Beef Liver	: Two samples, mercury determination.
Cherries	: Twelve samples were analyzed for detectable levels of three pesticides.

Two miscellaneous samples were also screened for pesticides.

In the realm of consumer health services, one blood sample was analyzed for serum lithium and a determination for lead was performed on a sample of pottery. (In regard to this last analysis, it should be noted that the Health Department does not perform routine lead screening tests on pottery. We become involved only when the determination is used as part of a diagnosis for an existing medical problem. The sample must be referred to us by a physician, via the Environmental Services Bureau.)

4. Occupational Health (Industrial Hygiene) Chemistry, Thomas Daly, Section Head

The decrease in samples concerning consumer protection was more than offset by a large increase in occupational health specimens. In addition to the 107 samples submitted by the Occupational Health Bureau, a screening program for pesticide applicators, administered by the Environmental Services Bureau, provided 112 blood samples to be analyzed for cholinesterase activity (exposure to organophosphate pesticides depresses cholinesterase activity). This totaled 219 samples, compared with 45 analyzed in fiscal 1973.

The 107 Occupational Health Bureau samples were subjected to 330 analyses:

87 air sampling filters analyzed for :	Iron	6 analyses
	Arsenic	6 analyses
	Copper	79 analyses
	Cadmium	63 analyses
	Lead	79 analyses
	Zinc	63 analyses

Calcium	2 analyses
Carbonate	2 analyses
Magnesium	2 analyses
Free silica	2 analyses

8 sampling filters analyzed for phosphate
10 ore and slag samples analyzed for phosphate, and pH was measured on 7 of the samples
1 clay sample analyzed for lead
1 blood sample screened for pesticides

This is a sizeable increase in sampling load, but an even greater number could be accommodated. An arrangement has been made with the State Department of Labor, Workmen's Compensation Division, to analyze some of their samples.

Since occupational health chemistry is performed in the same area and by the same personnel as environmental services chemistry, the 50% increase in working space benefited the occupational health area as well.

New capability was added when the cholinesterase screening program began. Two procedures, colorimetric and pH, were compared and the pH procedure of H. O. Michel was adopted. If the program is to be continued beyond the summer of 1974, instrumentation is available commercially and should be purchased to save analysis time and provide greatly increased accuracy.

The procedure for analysis of phosphates collected on membrane filters was modified to conform more closely with officially accepted procedures.

The laboratory continued to participate in the NIOSH proficiency program. Every two months a set of samples was analyzed for lead, cadmium, zinc and free silica by our chemists and asbestos counting was performed by the Occupational Health Bureau. Although our proficiency as determined by this program was not as good as would be desired, improvements could be seen with each successsive set of samples. The program led directly to a minor change in our procedure for free silica analysis, and should produce more changes in the future.

There are two major needs in the occupational health chemistry section: a perchloric acid fume hood and a working GC (gas chromatograph). Hot perchloric acid digestions are frequently used in our analytical techniques because $HClO_4$ is an extremely powerful oxidizing acid. Yet, this valuable property also renders its vapors extremely dangerous to personnel, and corrodes the ductwork in our present hoods.

Our present GC is a Beckman model GC-4 with electron capture (EC) and flame ionization detectors (FID). The EC detector has developed a leak which apparently cannot be repaired, and a replacement costs $900. The FID had never been used until May, 1974. During that time, the insulating properties of the ceramic broke down, with resulting drastic loss of sensitivity. A decision must be made, based on anticipated sample load for GC analysis, whether to repair the present instrument or purchase a new, greatly improved GC with increased versatility and several detectors.

5. General comments - Environmental Sciences Chemistry

As has been mentioned in the preceding sections, the chemistry laboratory expanded and remodeled its physical plant in fiscal 1974. The sale of laboratory furnishings during the closing of St. John's Hospital in Helena resulted in the laboratory's acquisition of 100 linear feet of laboratory bench, a Technicon dual-channel autoanalyzer I, a set of storage shelves, and several wall cabinets. An additional room was obtained for the laboratory and was outfitted with benches purchased by the Water Quality Bureau. Wall partitions were removed from three offices and a stockroom within the laboratory. Two new work areas and a room for the Air Quality microbalance were created in this space. These changes have doubled the work space available for air and water chemistry and increased the occupational health/environmental services chemistry space by fifty percent. However, additional space is still needed. Chemists' desks are occupying valuable work space where a new perchloric acid fume hood and locking refrigerator should logically be placed. As previously mentioned, an acid fume hood should be purchased soon before exhaust ductwork from the present hoods is ruined. Additional refrigerator space in the occupation health section also is badly needed. It must be a locking refrigerator to satisfy legal requirements of what constitutes admissible evidence in court, as any of our data could be used at any time in a prosecution case involving violation of state or federal regulations and standards.

The distilled water supply needs diversity and increased capacity. Our chemical analyses require three basic types of purified water : distilled-in-tin, distilled-in-glass, and distilled + deionized. The laboratory division has a central distilled-in-tin water supply located in the attic, but demand has increased to where our 12 gph still is unable to supply sufficient distilled water. A second still of 12 gph capacity is needed. We have no glass still at present, and only a small demineralizer cartridge, which needs to be supplemented or replaced by a much larger unit.

The chemists spend too much of their time after analyses are completed in the manual preparation of calibration curves, calculations, and reporting of results. A programmable calculator which will internally generate a calibration curve and perform all necessary calculations, plus a revised system of reporting data, will free more time for the actual sample analysis and thereby make the laboratory more efficient.

The interior of the Cogswell Building has not been painted since the building was built. Moving of partitions, installation of new wiring and plumbing, and other laboratory modifications over the years, plus a gradual accumulation of assorted grime, have resulted in less-than-optimal working conditions in the laboratory. Patching plaster and paint are needed to brighten up the laboratory and the chemists' spirits.

The last need is more operating money. Each year, the Bureau must depend on large infusions of funds from bureaus within the Environmental Sciences Division to balance the budget and purchase major equipment items. It is hoped that additional funding through grants and contracts with outside agencies can be arranged to enable us to satisfy our many pressing needs and further upgrade the quality and quantity of the services we provide.

6. Toxicology (Highway alcohol; alcohol and drug countermeasures)

Michael J. Harrington, Section Head

This unit has been built around the responsibilities of the Department in connection with the "Implied Consent" law, Section 32-2142.3 R.C.M. 1947. We endeavor to provide analytical capability for all substances which might interfere with a person's ability to operate motor vehicles on the highways of Montana. In addition we must provide quality control, including training and certification of operator and operator supervisors, on 16 Alco-Analyzers located in local law-enforcement agencies. The chemists provide expert testimony in court on DWI and related cases. They also participate in professional seminars and public discussions concerning problems associated with impairment of human faculties by alcohol, drugs, carbon monoxide, voltaile solvents and other substances. When accident investigations in the Highway Patrol Division run into problems involving substances coming within our purview, our chemists offer assistance.

In the past year, the work of this section has been expanded to include the servicing of two drug-screening contracts with the Department of Institutions. This involves tests on urine, and in some cases, identification of abused substances.

Here is a summary of the work of the section for fiscal year 1974:

a. Analyses to determine blood alcohol level

Done in our laboratory	1,782
Done on Alco-Analyzer units in the field	1,809
Total	3,591

b. October 1973 - 25 law enforcement officers attended an operator-supervisor school in Helena.

c. Alco-Analyzers in police stations were inspected and all were found to be in good working order and had received proper maintenance.

d. Additional simulators were purchased to provide two for each unit. One is used as the standard and the other for back-up and in the proficiency testing program.

e. Michael J. Harrington testified as an expert witness in court on 28 occasions during the year.

f. There were five presentations at professional seminars and public forums.

g. The chemists were called on to participate in ten special accident investigations.

h. Number of SM-7 Sobermeters registered and distributed = 3,800
i. Tests for the identification of "abused substances" = 81
j. Drug-screening tests on body fluids = 80
(Mainly for amphetamines, barbiturates, opiates, and methadone)

k. A special effort was made to maintain "currency" in developments in the field of the relationship of alcohol, carbon monoxide and abused substances to traffic accidents; particularly those aspects involving the laboratory.

l. Full participation in a quality control program (proficiency testing) for dangerous substances supplied by the Center for Disease Control of the Department of Health, Education and Welfare was maintained during the year.

m. Chemist Henry I. Grant attended a course on drug analysis given at the Center for Disease Control in Atlanta.

ALCO-ANALYZER USE BY LOCATION FOR FISCAL YEAR '74

CITY	No. of Tests	No. 0.10	No. of Refusals	Unit Proficiency
Billings	279	266	64	.008
Kalispell	258	256	18	.004
Bozeman	220	207	20	.002
Missoula	204	196	22	.004
Helena	134	131	62	.004
Great Falls	130	130	39	.004
Wolf Point	124	121	20	.004
Havre	111	98	26	.005
Glasgow	95	93	20	.004
Glendive	68	63	20	.004
Shelby	60	57	2	.007
Miles City	57	57	3	.003
Lewistown	46	44	14	.005
Butte	21	20	2	.005
TOTALS	1,809	1,739	*332	**.004

*Note the high number of refusals. Even with a refusal, Alco-Analyzer and the Implied Consent Law are working.

**The average deviation from a known value of the 14 Alco-Analyzer Units in the State is 0.004. This is well below the acceptable limit, as per Department of Health and Environmental Sciences Regulation (MAC Sec. 16-2.26 (1)-S2600) of 0.010.

ALCOHOL ANALYSES IN THE LABORATORY

Tests for Law Enforcement Agencies

	No. of Tests	No. 0.10
BREATH	951	900
BLOOD	736	582
URINE	45	44
TOTALS	1738	1526

Tests for non-Law Enforcement Agencies

BLOOD	44	31

TOTAL BLOOD ALCOHOL TESTS FOR THE PROGRAM

Alco-Analyzers	1809	1739
Laboratory	1782	1557
TOTALS	3591	3296

DRUG ANALYSES IN THE LABORATORY

Substance Identification

A. Marijuana is identified using the Duqenois-Levine Test.

B. All other substances are done using Thin Layer Chromatography and Gas Chromatography. Both methods are used for screening and confirmation. These methods allow us to screen for all commonly abused drugs.

	No. Tested	No. Positive	
Marijuana	37	34	
Other Substances	35		26 Identified
Totals	72	60	

SUBSTANCES IDENTIFIED	NUMBER
D-Amphetamine	7
M-Amphetamine	1
Barbiturate	2
Caffeine	3
Doxepin HCL	2
Doxycycline Hyclate	1
Glutethimide (Doridan)	1
*LSD	1
Meperidine	2
Nicotine	1
Phenyl Propanolamine	1
Phenothiazine	1
Propoxyphene (Darvon)	2
Strychnine	1

*LSD is identified by a special kit and not by thin layer or Gas Chromatography

Drug Screen of Body Fluids

All Drug screens are done using Thin Layer Chromatography and Gas Chromatography for screening and confirmation. Using these two methods, we can screen a sample for a battery of abused drugs including amphetamines, barbiturates, alkaloids, methadone, etc.

	No. Screened	No. Positives
BLOOD	15	0
URINE	64	4
GASTRIC CONTENTS	1	0
Totals	80	4

DRUGS FOUND	
Barbiturates	2
Meprobamate	1
Thorazine	1

TOTAL DRUG ANALYSES

	No.	No. Positive or Identified
Substances Identified	81	60
Body Fluid Drug Screens	80	4
TOTALS	161	64

MICROBIOLOGY LABORATORY BUREAU

Milton H. Brown, Bureau Chief

The microbiology laboratory performed 144,200 tests and accounted for $188,537 (72 percent) of the money spent directly from the budget of the Division ($259.579).

MICROBIOLOGY LABORATORY BUREAU

1. Diagnostic bacteriology

The determinative bacteriology part of this activity continued to be outstanding. Montana's Bud Brown served as one of two reference laboratories for the Center for Disease Control's National Proficiency Tests in Bacteriology again this year.

a. Organisms having a clinical origin which were speciated this year:

Species name	Total	Sources
Achromobacter xylosoxidans (Group IIIb)	2	1 feces; 1 urine
Acinetobacter calcoaceticus var anitratus (Herellea)	34	6 throat; 6 foot; 5 leg; 4 ear; 2 urine; 2 finger; 2 tracheal mucous; 1 buttocks wound; 1 eye; 1 incision; 1 I & D area; 1 elbow; 1 oral secretion; 1 wound
Acinetobacter calcoaceticus var lwoffi (Mima polymorpha)	17	3 throat; 2 foot; 2 leg lesion; 2 sputum; 1 breast discharge; 1 eye; 1 tumor; 1 tracheal wound; 1 incision; 1 urine; 1 lesion on face; 1 environment
Actinomyces sp	1	abscess, lung
Aeromonas hydrophila	2	1 foot, 1 throat
Alcaligenes denitrificans	1	blood
Alcaligenes faecalis	2	1 abscess, leg; 1 urine
Bacillus cereus-mycoides Group	2	1 injured hand debridement; 1 nail wound
Bacillus subtilis	3	1 sputum; 1 urine; 1 vaginal
Bacillus sp	23	3 ulcer, leg; 3 environment; 2 sputum; 2 eye; 1 skin scraping; 1 foot; 1 abscess, Bartholin gland; 1 nasopharyngeal; 1 sublingual area; 1 chest fluid; 1 throat; 1 abdominal fluid; 1 bile duct; 1 wound, arm; 1 tongue; 1 joint fluid; 1 CSF
Bacteroides fragilis ss distasonis	2	1 colostomy; 1 appendix
Bacteroides fragilis ss fragilis	3	1 abdomen; 1 pelvic cavity; 1 vaginal
Bacteroides fragilis ss thetaiotaomicron	3	1 wound, appendectomy; 1 colostomy; 1 blood
Bacteroides fragilis (not subspeciated)	31	6 wound; 5 ruptured appendix; 5 abdominal drainage; 3 abscess; 3 urine; 2 blood; 1 peritoneal cavity; 1 chest fluid; 1 bedsore; 1 fallopian tube; 1 colon incision; 1 urethral drainage; 1 cord
Bacteroides melaninogenicus	2	1 abscess, ear; 1 buttocks

Bacteroides oralis	2	1 aspiration, shoulder; 1 blood
Bacteroides sp	1	buttocks
Branhamella catarrhalis (Neisseria catarrhalis)	5	4 eye; 1 throat
Citrobacter diversus	3	2 urine; 1 sputum
Citrobacter freundii	5	3 urine; 2 stool
Clostridium butyricum	1	uterus
Clostridium paraputrificum	1	eye
Clostridium perfringens	30	6 wound; 6 ear; 4 abdominal drainage; 3 eye; 2 finger; 1 uterine wash; 1 blood; 1 facial; 1 appendix; 1 toe; 1 mouth lesion; 1 amputation, hand; 1 intestinal fluid; 1 neck
Clostridium ramosum	4	1 wound; 1 blood; 1 peritoneal fluid; 1 urethral drainage
Clostridium sordellii	1	abdominal bowel resection
Corynebacterium aquaticum	1	urine
Corynebacterium diphtheriae, atypical Intermedius type, toxigenic	1	nasopharynx
Corynebacterium sp	26	4 urine; 3 ear; 2 vagina; 2 cervix; 1 absces 1 abdominal drainage; 1 throat; 1 eye; 1 penis; 1 pleural fluid; 1 prostate surgery; 1 CSF; 1 placenta; 1 uterus; 1 wound; 1 skin infection; 1 sputum; 1 salivary gland; 1 environment
Eikenella corrodens	7	1 pleural fluid; 1 abdominal drainage; 1 bronchial washings; 1 laryngeal cyst; 1 salivary gland; 1 incision; 1 abscess, jaw
Enterobacter aerogenes	2	1 wound, leg; 1 throat
Enterobacter agglomerans	15	3 wound; 2 throat; 2 environment; 2 urine; 1 foot; 1 lesion, leg; 1 infected toe; 1 stool; 1 sputum; 1 burn, wrist
Enterobacter cloacae	14	4 urine; 3 throat; 2 sputum; 1 nodal drainage; 1 tracheal aspiration; 1 wound, gastrectomy; 1 infected ankle; 1 food
Enterobacter hafniae	3	feces
Escherichia coli	69	40 urine; 4 vagina; 4 abdominal drainage; 4 sputum; 3 wound; 2 ruptured appendix; 2 abscess; 1 small bowel; 1 throat; 1 gall bladder; 1 infected arm; 1 peritoneal cavity, 1 blood; 1 colostomy; 1 cord; 1 ear; 1 cervix

Flavobacterium meningosepticum	1	vaginal
Flavobacterium sp	4	2 urine; 1 eye; 1 tracheal mucous
Fusobacterium mortiferum	1	intra-abdominal cavity
Fusobacterium nucleatum	2	1 thoracentesis; 1 jaw
Group EF-4 (CDC)	1	wound, hand
Group M-4 (CDC) (*Mima polymorpha* var *oxidans*)	1	amniotic fluid
Group IIc (CDC)	1	eye
Group Va (CDC)	3	1 eye; 1 ear; 1 blister
Group Ve 2 (CDC)	2	1 burn; 1 pelvic sinus tract
Haemophilus aphrophilus	5	2 sputum; 1 abdominal incision; 1 finger; 1 submaxillary gland
Haemophilus haemolyticus	3	2 throat; 1 mouth
Haemophilus influenzae type A	3	1 sputum; 1 nostril; 1 endocervical
Haemophilus influenzae type B	7	4 CSF; 1 sputum; 1 throat; 1 ankle joint
Haemophilus influenzae not typed or no type	24	7 sputum; 4 throat; 4 nasopharynx; 2 placenta; 1 cervix; 1 CSF; 1 ankle joint; 1 blood; 1 eye; 1 bronchoscopy fluid; 1 vagina
Haemophilus parahaemolyticus	2	1 lung fluid; 1 blood
Haemophilus parainfluenzae	12	4 sputum; 1 mouth; 1 umbilical cord; 1 foot; 1 urethra; 1 throat; 1 cornea; 1 urine; 1 abscess, alveolar
Klebsiella ozaenae	1	sputum
Klebsiella pneumoniae	20	5 urine; 4 sputum; 3 wound; 1 breast discharge; 1 small bowel; 1 throat; 1 umbilicus; 1 discharge, meatus; 1 blood; 1 incision; 1 aspiration submental lobe
Lactobacillus sp	10	4 vagina; 3 urine; 2 cervix; 1 bartholin cyst
Micrococcus sp	12	2 sputum; 2 incision drainage; 1 wound 1 ear; 1 abdominal fluid; 1 cervical; 1 urine; 1 urethral discharge; 1 throat; 1 environment
Moraxella nonliquefaciens	7	4 nasal; 2 throat; 1 eye
Moraxella osloensis	5	1 blood; 1 urine; 1 CSF; 1 nose drainage; 1 urethral

Moraxella phenylpyruvica	1	urine
Neisseria flava (Neisseria subflava)	3	1 urine; 1 chest cavity; 1 sputum
Neisseria gonorrhoeae	2	1 wound surgery; 1 bartholin cyst
Neisseria meningitidis Group B	5	4 throat; 1 CSF
Neisseria meningitidis Group C	3	2 CSF; 1 eye
Neisseria meningitidis Slaterus Y	7	5 throat; 1 nose; 1 CSF
Neisseria meningitidis probable Slaterus Z' slight cross	1	throat
Neisseria meningitidis rough	1	throat
Neisseria mucosa	1	blood
Neisseria perflava (Neisseria subflava)	1	throat
Neisseria sicca	3	1 sputum; 1 sinus; 1 lung fluid
Neisseria subflava (see above)	1	ear
Pasteurella multocida	9	2 dog bite; 2 ear; 1 cat bite; 1 wound; 1 abscess, pelvic; 1 throat; 1 calf lung
Pasteurella ureae	1	sputum
Pasteurella n sp I "gas" (possible Pasteurella multocida)	1	wound, pet wolf bite
Peptococcus prevotii	3	1 anal area; 1 incision; 1 fallopian tube
Peptostreptococcus anaerobius	2	1 genital; 1 Bartholin cyst
Peptostreptococcus productus	1	abscess, abdominal surgery
Peptostreptococcus CDC Group 1	4	2 abscess; 1 abdominal drainage; 1 blood
Peptostreptococcus CDC Group 2	5	3 abscess; 1 thoracentesis; 1 wound
Peptostreptococcus sp	11	5 abscess; 2 Bartholin cyst; 2 thoracentesis; 1 pilonidal cyst; 1 urethral exudate
Propionibacterium acnes	7	1 neck lesion; 1 anal area; 1 thyroid surgery; 1 gall bladder surgery; 1 pilonidal cyst; 1 laparotomy; genital-uterine cavity; 1 blood
Propionibacterium avidum	2	1 lesion on leg; 1 Bartholin cyst
Propionibacterium granulosum	1	breast mass
Proteus mirabilis	14	5 urine; 2 sputum; 1 breast discharge; 1 small bowel; 1 throat; 1 eye; 1 abscess; 1 abdominal drainage; 1 ear

Proteus morganii	9	5 urine; 1 wound; 1 abscess; 1 amputation site; 1 feces
Proteus rettgeri	7	3 feces; 2 urine; 1 sputum; 1 vaginal
Providencia stuartii	2	urine
Pseudomonas acidovorans	1	burn
Pseudomonas aeruginosa	50	16 urine; 7 ear; 11 sputum; 3 throat; 2 abdominal drainage; 2 tracheal secretion; 1 ruptured appendix; 1 vagina; 1 breast discharge; 1 infected foot; 1 infected skin; 1 colostomy; 1 eye; 1 wound; 1 not stated
Pseudomonas alcaligenes	2	1 throat; 1 ulcer on leg
Pseudomonas cepacia	6	2 urine; 2 tracheal mucous; 1 nasal; 1 stomach site
Pseudomonas fluorescens	5	2 throat; 1 urine; 1 nasal; 1 sputum
Pseudomonas maltophilia	21	7 sputum; 3 urine; 3 bronchial washings; 1 throat; 1 chest wound; 1 infected toe; 1 eye; 1 tracheal suction; 1 abscess; 1 environment; 1 not stated
Pseudomonas pickettii	3	1 blood; 1 tracheal aspirate; 1 environment
Pseudomonas putida	6	2 urine; 2 tracheal aspirate; 1 throat; 1 sputum
Pseudomonas stutzeri	2	infected leg
Pseudomonas sp	2	1 throat; 1 sputum
Salmonella 4,5,12:non-motile	1	urine
Serratia liquefaciens	2	1 sputum; 1 throat
Serratia marcescens	3	1 urine; 1 sputum; 1 bronchial washings
Staphylococcus aureus	82	53 nasopharyngeal; 6 wound; 5 abscess; 3 ear; 2 infected finger; 2 throat; 2 infected foot; 1 skin lesion; 1 infected buttocks; 1 nodal drainage; 1 eye; 1 elbow fluid; 1 sputum; 3 not stated
Staphylococcus epidermidis	14	3 sputum; 2 eye; 2 environment; 1 node; 1 abscess; 1 pleural fluid; 1 abdominal drainage; 1 wound; 1 prostatic drainage; 1 CSF
Streptococcus faecalis	2	1 infected foot; 1 abscess
Streptococcus faecalis var *zymogenes*	1	blood

Streptococcus pneumoniae	5	2 sputum; 1 nasopharyngeal; 1 ear; 1 eye
Sreptococcus, alpha	19	3 vagina; 3 throat; 3 blood; 2 skin lesion; 2 abscess; 1 eye; 1 incision drainage; 1 CSF; 1 sputum; 1 salivary gland; 1 environment
Streptococcus, beta, Group A	14	3 ear; 3 wound; 3 facial infection; 2 infected finger; 1 spider bite; 1 urine; 1 cornea
Streptococcus, beta, Group B	19	4 vagina; 4 ear; 3 wound; 3 facial infection; 2 infected finger; 2 leg ulcer; 2 wound; 2 cervix; 1 spider bite; 1 urine; 1 cornea; 1 blood; 1 CSF; 1 infected foot; 1 nasal; 1 placenta; 1 urine; 1 throat; 1 eye
Streptococcus, beta, Group C	1	vagina
Streptococcus, Group D (enterococcus) (not further identified)	17	3 urine; 3 wound; 2 node; 2 vagina; 1 eye 1 abscess; 1 infected foot; 1 colostomy; 1 blood; 1 abdominal drainage; 1 cervix
Streptococcus, beta, Group F	2	1 abscess; 1 pleural fluid
Streptococcus, beta, Group G	4	1 ruptured appendix; 1 suture drainage; 1 supraglottal mass; 1 abscess, penis
Streptococcus, beta, not Groups A, B, C, D, F, or G	3	1 throat; 1 tracheal secretion; 1 pleural fluid
Streptococcus, beta, not grouped	1	wound
Streptococcus, non-hemolytic (gamma)	6	3 vagina; 1 urine; 1 uterine wash
Xanthomonas sp	1	knee aspiration

Concerning anaerobes:

Because of great distances in Montana, most of the material we receive is in transit for two to three days or longer. One can only guess as to how many anaerobes failed to survive the journey. Here is how we received those which did survive:

Stuart's Transport Medium = 38 percent
Thioglycollate = 27 percent
From agar slants or plates carried to the laboratory from local hospitals = 35 percent

It is our feeling based on experience that, until better methods are instituted, Stuart's Transport Medium is the most satisfactory one for transport of anaerobes.

For the past two years, all anaerobic isolates in our laboratory have been subjected to gas chromatography for final speciation.

John Hall, Section Head, Diagnostic bacteriology

b. Enteric Bacteriology : Total specimens 1,467
Examinations 16,546

Salmonella isolated = 62
Shigella isolated = 319
Other pathogenic enteric organisms isolated = 73

*Enteropathogenic E. Coli = 2
Other enteric organisms of significance identified = 86

Total positives = 542

Enteric serogrouping procedures = 126
Enteric serotyping procedures = 383

Salmonella enteriditis serotypes encountered and frequency :

Agona	1	Newport	11
Brandenburg	1	San Diego	1
Enteritidis	7	St.Paul	4
Heidelburg	1	Typhimurium	31
Litchfield	1	Typhimurium	2 var. Copenhagen
Montevideo	1	4,5,12 non-motile	1
New Brunswick	1		

Shigella types encountered and frequency :

Shigella flexneri 1	1	*Shigella flexneri* 2a	34
Shigella flexneri 3c	0	*Shigella flexneri* 4a	22
Shigella flexneri 5	2	*Shigella flexneri* 6	1
too rough to type	2	*Shigella sonnei*	257

*Fluorescent antibody tests were used this year for detection of enteropathogenic *E. coli*

c. Throat Cultures : Total specimens 4,297
Examinations 4,297

For *C. diphtheriae* = 7, with one positive
For beta-hemolytic streptococci = 4,290

Positives were distributed as follows:

S. pneumoniae	2	Group C	146
Group A	822	Group G	127
Group B	37	No Group	121

Specimens from throats for beta-hemolytic streptococci increased by 60 percent over the previous year.

Fluorescent antibody was used some this year for detection of Group A

As part of our continuing effort to keep track of the types of Group A beta-hemolytic streptococci causing trouble in Montana, we selected a batch of isolates recovered from multi-case episodes of streptococcal pharyngitis and sent them to CDC for typing (Richard R. Facklam, Ph.D., Chief, Staphylococcus and Streptococcus Unit, Clinical Bacteriology Section, CDC, Atlanta).

The results are given on the following page.

M type	T type	Frequency	Remarks
6	6	14	Responsible for an outbreak in S.E. Montana in the area of the N. Cheyenne Indian Reservation
1	1	6	From Hamilton, Glendive, and Lame Deer
NT	NT	3	
NT	12	3	
NT	4	2	
NT	8/25/Imp 19	2	
NT	9	1	
NT	3/13	1	
NT	5/27/44	1	
NT	28	1	
NT	11/12	1	
12	NT	1	
NT	2/28	1	
NT	4	1	
NT	3	1	
4	4	1	
12	12	1	

d. Brucella and Tularemia agglutination tests: Total specimens 62
Four positive for brucellosis
Three positive for tularemia

Patricia Maxey, Section Head, Serological tests for syphilis

e. Laboratory services related to the control of VENEREAL DISEASES
Serological tests for syphilis
Venereal Disease Research Laboratory (VDRL) tests
Premarital = 5,494 (There were 7,572 marriages in fy 1974.)
Prenatal = 6,890 (There were 11,403 live births in fy 1974.)
For diagnosis or screening = 22,322
Total VDRL tests = 34,706 (1,633 - 4.7% positive)

Tests on spinal fluid = 272 (one positive)

Fluorescent Treponemal Antibody Absorption Tests (FTA-ABS)
Number of tests = 946 (389 - 41.1% positive)

This section (Venereal Disease Serology) is responsible for approval of laboratories to perform serological tests for syphilis in Montana. In connection with this, proficiency tests consisting of ten specimens in each set were sent quarterly to 70 laboratories in the state. Approved tests are the VDRL and the RPR card test. One laboratory showed unsatisfactory performance in the VDRL test so we advised them to switch to the RPR test. One case of primary syphilis was detected via premaritals this year.

Cultures for Neisseria gonorrhoeae

Cultures for diagnostic purposes = 1,823 (295 - 16% positive)
Cultures from Family Planning Clinics = 5,878 (316 - 5.4% positive)
Total = 7,701
Slides for examination = 49 (22 positive)

Summary by month

Month	No. tested	No. positive	VD Program No.	VD Program positive	Family Planning No.	Family Planning positive
July	553	26	155	13	398	13
August	704	64	210	29	494	35
September	641	49	176	28	465	21
October	596	27	131	10	465	17
November	625	42	162	20	463	22
December	512	45	108	16	404	29
January	657	51	146	26	511	25
February	599	55	129	29	470	26
March	636	63	149	31	487	32
April	718	61	162	32	556	29
May	779	63	151	28	628	35
June	681	65	144	33	537	32
TOTALS	7,701	611	1,823	295	5,878	316

In addition to "bench work", consultation was provided for setting up VD clinics in Helena and Butte. Training was also provided for nurses from the VD clinic in Great Falls.

The cost of laboratory services related to VD this year was $59,351.

f. Screening for Phenylketonuria by the Guthrie Metabolism - Inhibition Test

Live Births in Montana : fy '74 = 11,403*
fy '73 = 11,049
fy '72 = 11,508
fy '71 = 12,252
PKU tests on newborn = 11,426 9,403 of these were done in the State Laboratory
Estimated resident population of Montana = 721,000 (This is the figure currently used by the Department in determining rates. It comes from the Bureau of the Census and may be exaggerated.)

Number of confirmed PKU's this year = 2
Number of marriages in Montana fy '74 = 7,572

Summary for fiscal years 1967 through 1974 :

Number of live births = 92,038
Tests for PKU = 90,067
Confirmed cases of PKU = 6
Ratio of PKU : Live Births = 1 : 15,339

*This seems to be a nationwide trend. The rate decreased for a few years but started up again this year.

Robert Clark, Section Head, Virology

g. Virology	SEROLOGY No. Tested	 No. Positive	VIRUSES ISOLATED
Influenza Group A	190	0	0
Influenza Group B	190	9	0
Enteroviruses	336	see below	2
Adenoviruses	209	3	2
Mycoplasma pneumoniae (PPLO)	273	9	not done
Mumps (meningoencephalitis)	37	2	0
Rubeola	442	133	4
Colorado tick fever	82	10	8
Rocky Mt. Spotted Fever	84	0	0
Q fever	6	0	0
Western Equine Encephalitis	55	0	0
Rubella (diagnostic only)	216	4	
Infectious mononucleosis (Ox-cell hemolysin)	152	25	
Respiratory synctial virus	13		
Parainfluenza 1,2,3	12		
Typhus	2		
Total	2,299		

The 1974 Group B influenza epidemic almost missed Montana. However, a few cases were identified and some cases of Reye's syndrome following influenza were noted. Predictions are for a major influenza epidemic this winter due to the A_2 / Port Chalmers / 1/7 (H3N2) subvariant.

In fy 1974 Coxsackie A 9 was the only enterovirus identified. We made two isolations of virus and CDC found a significant rise in neutralizing antibody titer for A 9 in an index case referred to them.

Specimens for virus isolation attempts numbered 245, distributed as follows: throat swabs = 112 ; rectal swabs = 79 ; spinal fluid = 46 ; blood = 21

Specimens from suspected cases of hepatitis to be tested for Australia Antigen (HBAg) are sent to the Phoenix Field Station of CDC. This year 141 sera were sent; 20 were classified as positive. They use the radioimmune assay test as a standard procedure.

There were no chlamydial infections (psittacosis group) observed this year.

Here is some data taken from our records for the past ten years on positive serological tests.

	Colorado Tick Fever	Rocky Mt. spotted fever	Tularemia	Brucellosis
1964	1		(no records before 1970)	
1965	5	3		
1966	1	1		
1967	4			
1968	3	1		
1969	1			
1970	6		1	
1971	5	1	5	2
1972	8		3	
1973	10	1	2	4
1974	8		3	1

Neutralization tests to maintain surveillance of level of immunity to poliomyelitis (thru 21 years of age) :

Number of tests = 334
positive against all three types (immune) = 111 (33 %)
susceptible to one or more types = 223
negative with all three types = 12
positive against type 1 only = 29
positive against types 1 and 2 = 58
positive against types 1 and 3 = 29
positive against type 2 only = 33
positive against types 2 and 3 = 24
positive against type 3 only = 22

Hemagglutination-Inhibition tests to determine immune status with respect to rubella (German measles) :

Number of tests = 18,278 Number non-immune = 1,599 (8.7%)
Cost of program in the laboratory = $24,858

Monthly Report - Rubella Hemagglutination - Inhibition Tests

Month	Number Tested	Number non-immune	Breakdown				
			Prenatal	Premarital	Fam.Pl.	Diagnostic	Sent Directly to virus lab.
July	1551	152	638	494	376	43	466
August	1893	194	849	598	415	31	535
September	1341	118	696	296	283	66	447
October	1629	102	879	293	423	34	388
November	1326	76	627	362	303	34	351
December	1184	85	577	261	319	27	352
January	1505	134	820	184	468	33	430
February	1657	130	872	194	550	41	404
March	1158	101	659	190	377	32	266
April	1538	147	621	412	352	153	423
May	2086	180	785	705	489	107	724
June	1814	180	633	837	312	32	717
TOTALS	18,682	1,599 (8.7%)	8,656	4,826	4,667	633	5,503

In diagnostic microbiology we have worked for improvement in laboratories in Montana doing bacteriology. A one-week's course in clinical bacteriology is offered each year. This year there were 16 students enrolled. This is usually arranged for two persons at a time and it gives them a chance to work at the laboratory bench and to study for a full week with Milton Brown, Chief, Microbiology Laboratory Bureau. This course is sponsored by the Montana Medical Education and Research Foundation and is part of our general laboratory improvement program in cooperation with the Hospital and Medical Facilities Division. Also as part of this program, we send out proficiency tests in bacteriology twice a year to about 70 laboratories in Montana. When results are in, a critique is distributed to participating laboratories. This has proven to be a valuable tool for continuing education in diagnostic bacteriology.

2. Ella Mae Howard, Section Head, Sanitary and environmental microbiology

a. Food

Following attendance by the section head at the FDA course,, "Food Microbiology", all work in this area has been consolidated in this section. It includes samples submitted for checks on quality as well as samples of food suspected of being involved in food poisoning. All food samples are handled in accordance with techniques recommended by FDA.

In the area of food-laboratory technology, we provide services to the Environmental Services Bureau. All county sanitarians have been supplied with our food sampling kits and this has resulted in an increase in analyses performed in the laboratory, and an improvement in the quality of samples reaching us.

For the second year we participated in the FDA quality control program. Seven split samples were analyzed according to FDA - recommended techniques.

Origin of food samples tested :

Consumer complaints	18
Food poisoning	9
FDA Contract	37
FDA split samples	7
Other	1
	72
plus Soft Ice Cream	52
Total	124

Tests performed on the above samples :

	No. of specimens subjected to test	No. of tests
Aerobic Plate Count	53	106
Coliform MPN	58	116
E. coli MPN	54	270
Coagulase positive staphylococci MPN	22	88
Salmonella	13	52
Can examinations	11	55
Identification of bacteria	2	6
Total	213	693

b. Water

Before converting to membrane filter techniques for water analysis, "Standard Methods" recommends parallel testing of samples by both multiple tube and filter techniques. About 750 samples have been done to date. They have included treated and untreated public water supplies from all areas of the state. The study will be continued through the fall to gather more data on supplies of raw water. When all data has been accumulated, an evaluation of the membrane filter technique as it applies to conditions in Montana will be made. Presently, the membrane filter technique is being used for the routine testing of 35 municipal supplies.

Support for the field activities of the Water Quality Bureau has increased considerably. In 1972 no samples for assessment of water quality were processed; in 1973, 247 such samples were run, and in 1974, 344 water quality samples were checked.

Inspection of water laboratories under Interstate Quarantine Regulations is another responsibility of this section. Three laboratories were visited for formal inspections during the year. Training assistance was also given to several individuals who are setting up water microbiology laboratories. They usually spend the better part of two days in the state laboratory. This is another area where our responsiblities are increasing because a number of laboratories are getting geared up to run the tests required by the Federal Discharge Permit Program.

Enforcement of the 48-hour age limit on samples of potable water was rigid this year. Samples received which are over 48 hours in transit are not analyzed. Containers are sent to the consumer for repeat sample. Adherence to this rule not only increases the workload but also the cost per sample. However, we feel that there are valid reasons for this requirement. The poor quality of mail service in some areas of the state, and the very size of Montana, creates a big problem. This is a good argument for setting up district laboratories if it ever became financially feasible.

Origin of water samples tested :

Private supplies	2,135
Municipal supplies	8,120
From Federal Gov't.	1,099
From State Agencies	356
For Water Quality	344
Municipal Supplies for MPN	353
Recreational Waters	60
Schools	155
Other	16
Total	12,625

Tests performed on the above samples :

	No.of specimens subjected to test	No. of tests
Negative presumptive	10,656	10,656
Positive presumptive	1,606	1,606
Confirmed positive	1,224	1,224
Completed	153	628
Membrane filter verification	141	560
5-tube fecal coliform	47	47
Total coliform MPN	430	860
Fecal coliform MPN	51	153
Membrane filter - municipal supplies	375)	
Total coliform -membrane filter	1,407)	2,439
Fecal coliform -membrane filter	252	504
Fecal streptococci - membrane filter	70	140
Fecal streptococci - identification	4	8
Sulfate reduction	3	3
Algae	1	1
Pseudomonas -membrane filter (M-PA	17	34
Klebsiella identification	1	3
Turbidities	293	293
Total number of tests - water		19,159

TOTAL NUMBER OF SAMPLES RECEIVED IN THE SANITARY AND ENVIRONMENTAL MICROBIOLOGY SECTION = 12,733

TOTAL NUMBER OF TESTS CARRIED OUT ON THESE SPECIMENS = 19,852

3. Mel-Iden Chambers, Section Head, Mycobacteriology, Mycology, and Parasitology

a. Mycobacteriology

Total specimens received		3,181	(1973 = 2,873)
Smears	3,784		
Cultures	14,091		
Biochemical	342		
Total exams	18,199		

Antibiotic sensitivity	78
Referred cultures to State	43
Referred cultures to CDC	10

M. Tuberculosis 118

Atypical mycobacteria : 24

M. scrofulaceum	1
M. kansasii	6
M. avium-intracellulare	1
M. gordonae	15
M. terrae	1

b. Mycology

Total specimens received 175 (1973 - 146)

Dermatophytes :

Microsporum canis	1
Trichophyton rubrum	3
Trichophyton mentagrophytes	6
Trichophyton verrucosum	2
Microsporum gypseum	1
Trichophyton schoenleini	1

Systemic :

Blastomyces dermatitidis	1
Coccidiodes immitis	1
Nocardia asteroides	2

Subcutaneous :

Fonsecaea pedrosoi	1

Mycology Serology : (Referred to CDC)

	Received	Positive
Histoplasmosis	45	6
Blastomycosis	45	0
Coccidioidoegcosis	45	0
Cryptococcosis	3	0
Candidiasis	2	2
Sporotrichosis	1	0

Yeasts :

Ascosporogenous yeast	1
Candida albicans	20
Saccharomyces cerevisiae	5
Cryptococcus neoformans	3
Candida krusei	4
Torulopsis glabrata	2
Candida tropicalis	4
Torulopsis sp.	1
Candida parapsilosis	5
Rhodotorula sp.	1
Candida pseudotropicalis	1
Cryptococcus uniguttulatus	1
Candida sp.	2
Trichosporon cutaneum	1
Cryptococcus albidis	1
Cryptococcus sp.	1
Candida guillermondii	1

Contaminants :

Monilia sitophila	1
Mucor sp.	2
Cladosporium sp.	7
Rhizopus sp.	5
Alternaria sp.	4
Scopulariopsis sp.	4
Cephalosporium sp.	3

b. Mycology (Cont'd)

Contaminants (Cont'd)

Rhizopus nigricans	1
Penicillium sp.	10
Sphaeronema sp.	1
Aureobasidum sp.	1
Aspergillus sp.	13
Oospora sp.	1
Sepedonium sp.	1
Phoma sp.	2
Paecilomyces sp.	2

c. Parsitology

Total specimens	380	(1973 = 283)
Parasites identified	84	

Protoza	62
Helminths	22

Giardia lamblia	18
Dientamoeba fragilis	2
Endolimax nana	12
Entamoeba coli	20
Entamoeba hartmanni	3
Entamoeba histolytica	4
Iodamoeba butschlii	1
Chilomastix mesnili	1
Ascaris lumbricoides	5
Clonorchis sinesis	1
Hymenolepis nana	1
Trichuris trichiura	7
Hookworm	6
Enterobius vermicularis	2
Schistosoma mansoni	1

Parasitology Serology (Referred to CDC)

Total specimens received 58

	Received	Positive
Toxoplasma	49	7
Trichinosis	3	0
Amebiasis	4	1
Leishmaniasis	1	0
Malaria	1	0

4. Services provided by the Microbiology Laboratory Bureau to the Indian Health Service, Billings Area.

Reference laboratory services are provided to hospitals and clinics operated by the Indian Health Service on the same basis as any similar facility in the state. Although we provide an estimate of the cost of this service, no reimbursement is received from IHS. Indians are citizens of Montana and entitled to the same services from the state as any other resident. Installations from which specimens are received are located at Box Elder, Browning, Crow Agency, Harlem, Lame Deer, Poplar, St. Ignatius, Fort Washakie, and other Billings area locations. Here is a summary of services for fiscal year 1974:

	Number	Total cost
Throat cultures for beta-hemolytic streptococci @ $1.20	927	$1112.40
Infant screening for phenylketonuria @ $1.02	423	431.46
Culture for acid-fast organisms (especially M. tuberculosis) @ $7.40	1443	10,678.20
Antibiotic sensitivity tests on mycobacteria @ $11.30	48	542.40
Identification of organism and culture @ $5.70	381	2171.70
Rubella hemagglutination-inhibition @ $1.36	956	1300.16
Tissue culture for detection of viruses @ $25.40	27	685.80
Serological test for viral antibodies @ $5.10	77	392.70
VDRL test for syphilis @ $1.00	5408	5408.00
FTA-ABS for syphilis @ $5.70	159	906.30
Tularemia-brucella agglutination test @ $2.30	3	6.90
Test for infectious mononucleosis (Ox-cell hemolysin) @ $2.30	2	4.60
Examination for parasites and ova @ $5.40	135	729.00
Culture for Neisseria gonorrhoeae @ $2.50	72	180.00
Bacteriological analysis of drinking water @ $4.00	94	376.00
Totals	10,155	$24,925.62

One of the major problems on the reservations is TUBERCULOSIS and we consider culturing for Mycobacterium tuberculosis as our most worthwhile service to the Indian population.

LABORATORY DIVISION - FINANCIAL

Statistical information being gathered by the Association of State and Territorial Health Officers for 1974 emphasizes the use being made of 314 (d) funds. Therefore, such monies budgeted in the laboratory are identified. The official designation is "Partnership for Health" Section 314 (d) Public Health Service Act as amended by Public Law 89-749. When 314 (d) was implemented in 1967, the sum of $90,000,000 was appropriated to be divided among the states. Although many believed that this amount would be increased to $200,000,000 at least by 1974, it has not occurred and the fund seems to be stuck at the original figure. Montana's share for fiscal year 1975 is $470,000 and $108,383 (23%) is expended through the laboratory budgets as indicated

(Table begins on following page)

FINANCIAL - Cont'd

FUNDS BUDGETED IN THE LABORATORY DIVISION, FY 1975

<table>
<tr><th rowspan="2">Budget No.</th><th rowspan="2">Title</th><th rowspan="2">Total</th><th colspan="3">Source</th></tr>
<tr><th>314 (d)</th><th>Other Federal</th><th>State Gen. Fund</th></tr>
<tr><td>0370</td><td>Community Disease Control</td><td>$86,318</td><td>$39,153</td><td>- -</td><td>$47,165</td></tr>
<tr><td></td><td colspan="5">What the money is spent for: Diagnostic virology and tests in conjunction with the immunization program; reference clinical microbiology; tests to aid in control of venereal diseases; tests for tuberculosis, fungus diseases and parasitic diseases.</td></tr>
<tr><td>0470</td><td>Health Services</td><td>$20,157</td><td>- - -</td><td>$10,805
(MCH)</td><td>$9,352</td></tr>
<tr><td></td><td colspan="5">Infant screening for evidence of phenylketonuria and other inborn errors of metabolism. Services to family planning clinics including cultures for Neisseria gonorrhoeae, serologic tests for syphilis, and tests to determine immunity to German measles.</td></tr>
<tr><td>0570</td><td>Health Care Facilities</td><td>$50,575</td><td>$29,455</td><td>$5,900
(BHI)</td><td>$13,220
2,000(Contract)</td></tr>
<tr><td></td><td colspan="5">Consultation to the Hospital and Medical Facilities Division in conjunction with certification of facilities under titles XVIII & XIX and state licensing of facilities. This includes registration of laboratories and personnel working in them (Montana Administrative Code 16-2.26 (2) - S2610 APPROVAL OF LABORATORIES AND 16-2.22 (1) - S2200 HOSPITAL AND MEDICAL FACILITIES (f) Laboratory).
Laboratory improvement. This includes proficiency testing, quality control, and courses of instruction.
Consultation on clinical and determinative microbiology is provided to other laboratories in the state and nation. Consultation on drugs and narcotics is also provided under contract to programs in the Department of Institutions.</td></tr>
<tr><td>0571</td><td>Highway Alcohol Testing</td><td>$46,386</td><td>- - -</td><td>$46,386(DOT)</td><td>- - -</td></tr>
<tr><td></td><td colspan="5">This activity fulfills the Department's responsibility under the "Implied Consent" law (Section 32-2142, R.C.M. 1947). It includes the provision of analytical services for all substances which might interfere with a person's ability to operate a motor vehicle; provision of quality control, including training and certification of operators and operator supervisors, on 17 Alco-Analyzers located in local law-enforcement agencies; provision of expert testimony in court on DWI and related cases; participation in professional seminars and public discussions concerning problems associated with impairment of human faculties by alcohol, drugs, carbon monoxide, voltaile solvents and other substances; provision of assistance to the Highway Patrol in special accident investigations when the officer believes that any of the substances coming within our purview may be involved.</td></tr>
<tr><td>0670</td><td>Environmental Sciences
Microbiology Laboratory</td><td>$35,477</td><td>$4,178</td><td>- - -</td><td>$31,299*</td></tr>
<tr><td></td><td colspan="5">Microbiology of food and water. Testing of drinking water supplies for safety and other samples for determination of quality. Testing of food for determination of quality. Tests on samples of food suspected of being a cause of food poisoning.</td></tr>
</table>

*We bring almost this amount into the general fund through collection of fees for analysis of drinking water (Section 69-4904, R.C.M 1947 Authority for tests to assure the safety of drinking water supplies and establishing a fee to cover cost of same.).

FINANCIAL - Cont'd

0671	Childhood Lead Poisoning Control Project	$28,487	- - -	$28,487 (grant from CDC)	- - -

The purpose of this project is to establish a capability in the state laboratory to screen samples of blood for lead content. After this is accomplished, we are to screen at least 500 EPSDT children for lead.

0675	Environmental Sciences, Chemistry Laboratory	$43,312	$35,597	$1,798 (Env.Serv.grant)	$5,917

To provide chemical analytical services for bureaus in the Environmental Sciences Division. This includes occupational health, air quality, water quality, environmental services, and solid waste management. Some testing is also done for the Health Services Division.

SUMMARY :
314 (d) = $108,383
Other Federal = 93,376
State General Fund = 108,953

Total $310,712

(This total figure does not include all personnel working in the laboratory nor all expenses associated with their activity. In microbiology we have a bacteriologist employed by the tuberculosis program and one employed by family planning. Some money for additional supplies is also made available to us from immunization, tuberculosis, venereal disease, and family planning. In chemistry there are five chemists employed by air and water quality. There are some additional funds provided for their supplies and equipment but this is inadequate for the current fiscal year. Additional cash flow is estimated at $70,000 for personnel and $20,000 for extra supplies. This gives a total cash flow in the Division of $400,712. However, it does not include the indirect costs for the Central Services Division which may have been taken out of grants and contracts.)

The source of funds and distribution of expenditures for the Division itself for fiscal year 1974 was as follows :

Source and amount	
State Appropriation	$99,500
Federal	148,631
Earned Income (special alcohol or drugs @$6.00)	4,600
Other (temporary deficit)	5,264
	$257,995

Expense and distribution	
Salaries	$173,996
Supplies	51,846
Equipment	4,698
Travel	3,871
Personnel benefits	23,584
	$257,995

(This figure of $257,955 compares with $310,712 for the current fiscal year. The increase of $52,717 for fy 1975 represents the largest percentage increase for any Division in the Department.)

FINANCIAL Concluded

The amount spent in fiscal year '74 for Environmental Health laboratory tests from the laboratory budget (No. 0670) was $59,861.84. It was distributed as follows:

Potable water supplies	$32,366.88
Water Quality	19,422.56
Air Quality	6,176.54
Food Control	698.62
Pesticide Control	698.62
Industrial hygiene	498.62
	$59,861.84

Source of this money was 314 (d) $28,291, and State General fund $31.570.84

Respectfully submitted,

David B. Lackman

David B. Lackman, Ph.D., Administrator
Laboratory Division
State Department of Health and Environmental Sciences
December 10, 1974